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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,248	08/22/2003	Onur G. Guleryuz	AP170HO	9411

20178 7590 01/25/2007  
EPSON RESEARCH AND DEVELOPMENT INC  
INTELLECTUAL PROPERTY DEPT  
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EXAMINER
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PATEL, KANJIBHAI B

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/646,248

Applicant(s)

GULERYUZ, ONUR G.

Examiner

Kanji Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 1/20/04, 6/12/06.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

1. Information Disclosure Statement submitted on 6/12/06 and 1/20/04 have been considered by the examiner.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claims 1-7, 11-17 and 21-27** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

**Claims 1, 11 and 21** recite the limitation of “**grouping non-missing data elements** into n layers” in lines 3, and 4. The specification does not disclose such a limitation of grouping non-missing data elements into n layers. The specification does disclose on page 5, line 25 regarding “grouping the missing pixels into layers as shown in Fig. 1”

**Claims 2-7, 12-17 and 22-27** depend directly or indirectly from the rejected base claims and therefore they are rejected for the same reasons.

### *Claim Rejections - 35 USC § 102*

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3. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1-2, 4-12, 14-22, and 24-30** are rejected under 35 U.S.C. 102(e) as being anticipated by Kim (US 6,636,565 B1).

**As to claims 1, 11 and 21**, Kim discloses a method for recovering missing data in a digital signal (Figures 2-6; column 4, lines 18-26; abstract), comprising the steps of:

(a) grouping non-missing data elements (column 4, lines 27-38) in at least one region in which at least some data is missing into  $n$  layers (, where  $n$  is an integer greater than or equal to 1(column 3, lines 46-49; each slice reads on each layer);

(b) assigning an initial value to each missing data element in the at least one region (column 7, lines 11-14; E11, E12, E21, E22 in Figure 5 provide an initial value to each missing data element); and

(c) for each of the  $n$  layers

(c)(1) evaluating a plurality of orthogonal transforms over layer  $n$  (column 7, lines 4-38),

(c)(2) thresholding select transform coefficients in layer  $n$  using a threshold to determine a set of transform coefficients that have absolute values below the threshold (steps S2 and S3 in Figure 6 provides thresholding; steps S9, S10 provide transform coefficients),

(c)(3) constructing a selection matrix (equation 5; column 3, lines 46-48;

16x16

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provides a selection matrix) using the set of transform coefficients determined in (c)(2),

(c)(4) constructing a system of linear equations (at least equation 6)

based on the selection matrix constructed in (c)(3), and

(c)(5) solving the system of linear equations constructed in (c)(4) to solve for the missing data elements in layer n (column 6, lines 54-62; steps S7, S11, expression 7).

**As to claims 2, 12 and 22**, Kim discloses the method, wherein each of operations (c)(1) through (c)(5) is performed only once per layer (Figure 6).

**As to claims 4, 14 and 24**, Kim discloses the method, wherein the at least one region in which at least some data is missing contains at least one of an edge or a texture feature (column 1 line 62 to column 2 line 6).

**As to claims 5, 15 and 25**, Kim disclose the method, wherein the plurality of orthogonal (column 7, lines 25-38) transforms comprises

a discrete cosine transform and a predetermined number of its overcomplete shifts (steps S9-S11).

**As to claims 6, 16 and 26**, Kim discloses the method, wherein the digital signal is an image or video frame comprised of a plurality of pixels and the at least one region in which at least some data is missing comprises at least some pixels that are missing ((Figures 4-5).

**As to claims 7, 17 and 27**, Kim discloses the method, wherein all of the pixels from the at least one region are missing (Figure 5).

**As to claims 8, 18 and 28,** Kim discloses a method for recovering missing data in a digital signal representing an image (Figures 4-6; abstract), comprising the steps of:

(a) adaptively determining a selection matrix (column 3, lines 46-48; 16x16 matrix provides a selection matrix) for each of  $n$  layers of a region (column 3, lines 46-59; each slice reads on each layer) in which at least some data is missing,  $n$  being an integer greater than or equal to 1;

(b) constructing a system of linear equations (equations 5-6) based on each selection matrix; and

(c) solving each constructed system of linear equations to solve for the missing data in the corresponding layer  $n$  (Figure 6; column 6, lines 54-62).

**As to claims 9, 19 and 29,** Kim discloses the method, wherein the selection matrix (column 3, lines 46-48; 16x16 matrix provides a selection matrix) for each of  $n$  layers is adaptively determined based on the image and information in an area surrounding the region in which at least some data is missing (Figure 5).

**As to claims 10, 20 and 30,** Kim discloses the method, wherein the selection matrix (column 3, lines 46-48; 16x16 matrix provides a selection matrix) for each of  $n$  layers is adaptively determined by adaptively determining, based on the image and information in an area surrounding the region in which at least some data is missing (Figure 5), a set of transform coefficients (steps S9-S11) that have absolute values below a threshold (steps S2-S3), and then determining the corresponding selection matrix therefrom (steps S4-S7).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3, 13 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,636,565 B1) as applied to above claims and further in view of Brewster et al. (US 6,070,133).

**As to claims 3, 13 and 23**, Kim discloses the method for concealing error using thresholding but he does not clearly disclose that the thresholding comprises hard-thresholding. However, Brewster et al. disclose that denoising methods based on the wavelet transform have been extensively studied using hard thresholding (column 5, lines 4-8). Brewster further teaches regarding replacing of smaller wavelet coefficients by zeros (i.e. smaller than predetermined threshold). This gives the greatest compression and speed. Therefore, it would have been obvious to one of ordinary skill in the art to modify Kim by using hard thresholding as taught by Brewster et al. Because such a modification will provide one of the effective denoising method (column 5, lines 4-8).

**Other prior art cited**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hannuksela et al. (US 6,611,561 B1)) disclose a video coding.

Khansari et al. (US 6,141,448) disclose a low-complexity error-resilient coder using a block-based standard.

Frey, Jr. (US 6,369,749 B1) discloses an adaptive control of detection threshold of a binary integrator.

Quadranti et al. (US 6,594,391 B1) disclose a method and apparatus for texture analysis and replicability determination.

Valente (US 6,768,495 B2) discloses a preprocessing method applied to textures of arbitrarily shaped objects.

Berkner (US 7,068,851 B1) discloses a multiscale sharpening and smoothing with wavelets.




**Contact Information**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kanji Patel whose telephone number is (571) 272-7454. The examiner can normally be reached on Monday to Thursday from 8 a.m. to 6:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lillis Eileen can be reached on (571) 272-6928 The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kanji Patel  
Art Unit 2624  
1/18/07

  
**KANJIBHAI PATEL**  
**PRIMARY EXAMINER**